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WHALE MARKING II
DISTRIBUTION OF BLUE, FIN AND HUMPBACK WHALES MARKED FROM 1932 TO 1938

by

George W. Rayner

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By

GEORGE W. RAYNER

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WHALE MARKING II

DISTRIBUTION OF BLUE, FIN AND HUMPBACK WHALES MARKED FROM 1932 TO 1938

By George W. Rayner

(Plates V–XXII; Text-fig. 1)

THE progress and results of whale marking up to December 1939 have been described in a previous report[1] wherein is recorded the number of whales effectively marked and the details of the 203 marks then recovered. It was shown from this evidence that the striking feature of whale migration was the manner in which whales of all the three species concerned were found year after year in the same region of the Antarctic as that in which they were marked. This was quite rigidly so in the case of Humpbacks and to a lesser degree with Blue and Fin whales, which are occasionally to be found at more considerable distances from the positions where they were marked. It was also for the first time proved by direct evidence that Humpback whales move from the Antarctic to tropical waters in very definite migrations.

Whaling has only continued on a very subdued scale during most of the war years, but additional marks have been recovered since 1939, all corroborating the results arrived at up to that time. In the case of Fin whales we now possess marks recovered at every yearly interval up to thirteen, and in no instance is the distance between the position of marking and the position of recovery greater than already recorded in the above-mentioned report, which dealt only with marks recovered up to periods of four years. Now that whaling in the Antarctic has recommenced on a considerable scale a greater number of recoveries may be expected in the near future, but until this accrues it is felt that the time has not yet come for a fresh analysis of the data. In the meantime since the previous report gave no more than a rough indication of the distribution of marking (Plate XLV) it is considered useful to publish a detailed record of the positions of markings. These fuller details will substantiate the data already published, and perhaps clarify some of the conclusions reached. The positions of marking show, for instance, the importance of negative results. If whales are marked in various regions over a series of years a certain proportion of recoveries may be expected, and it would be of considerable significance if no marks (or exceptionally few) were recovered from whales marked in substantial numbers in some definite region on a particular occasion. In the same connexion the division of Humpbacks into stocks off Enderby Land and off Queen Mary Land can be considered established; if it were otherwise it is reasonable to conclude, in view of the number of markings off Enderby Land, that whales from both regions would have been taken off North-west Australia.

It is not proposed to draw any new conclusions in this paper, which is intended simply to record positions of marking; but studied in conjunction with the report of 1940 it will be of assistance to those interested in the distribution and migrations of whales.

The positions of marking are now set out in a series of monthly plottings dealing with each of the three important species (Plates V to XXII). Two charts drawn on a polar equidistant projection cover the region from 90° W to 120° E in which whale marking has been carried out (see Text-fig. 1). These charts have been divided into quadrilateral areas bounded by one degree of longitude and thirty minutes of

[1] Rayner, G. W., 1940, *Whale Marking, Progress and Results to December* 1939, Discovery Rep., XIX, pp. 245–84.

latitude, and it is upon these units of area that the plotting of distribution is based. These areas decrease in size towards the south, and as the projection is not an equal area representation the actual areas of the quadrangles are not strictly comparable, but may be taken as nearly so. One of the unit areas comprises in latitude 55° S, approximately 1034 square miles, in latitude 60° S, 900 square miles, and in latitude 65° S, 762 square miles. The number of whales marked in each area is represented by symbols, a solid circle indicating ten whales and an open circle one to nine whales. The full number of whales marked is shown by these circles, but whales from which marks have been recovered are additionally represented by crosses, each cross standing for one whale.

In the neighbourhood of the Shag Rocks to the north-west of South Georgia this system has not been followed in the case of Fin whales. There a circle of 70 miles radius has been drawn with the Shag Rocks as centre, and all the Fin whales marked within the area circumscribed have been plotted

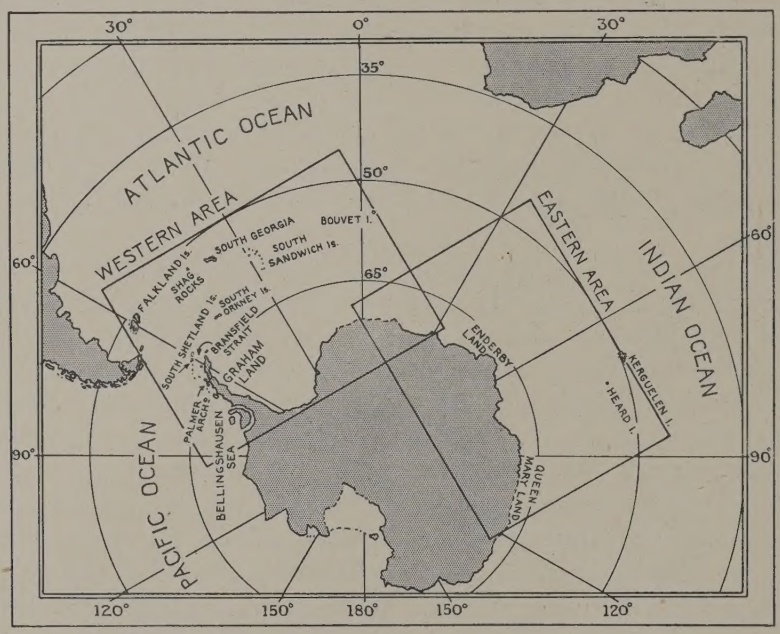


Fig. 1. Key chart showing place names and the two areas covered by Plates V–XXII.

together. The intense marking in this region was carried out from a hired whale catcher, and positions of the marked whales are in some cases recorded in the logs in such a way that they cannot be plotted so precisely as in other regions, although they do fall within the 70-mile circle. Also, it has been shown (Rayner, 1940, p. 261) that Fin whales marked within 70 miles of the Shag Rocks do not thence proceed directly to South Georgia, and there is thus some advantage in plotting them as a single unit, separate from those found farther east.

In the earlier paper (loc. cit.) the numbers of whales given as effectively marked were Blue 668, Fin 3915, Humpback 558, but the numbers used for the present paper are slightly lower, for they include only those actually recorded as hits, together with the few which, though recorded as misses or 'possibles', were subsequently recovered. The previous report included 'half the remaining possible hits' in the total, but these have now been disregarded. A few whales, viz. 16 Blues, 18 Fins and 4 Humpbacks, marked by the R.R.S. 'William Scoresby' in December when approaching the grounds fall a little beyond the boundaries of the charts used. Also some whales have been marked on

passages out and home and are not included; nor are those marked by R.R.S. 'Discovery II', all of which lie outside these charts. The numbers represented on the charts are:

	Blue		Fin		Hump	
	W	E	W	E	W	E
Nov.	38	—	142	—	(1)	—
Dec.	214	36	932	151	16	84
Jan.	96	105	1366	286	(7)	265
Feb.	(1)	122	187	431	33	105
Mar.	(7)	25	46	302	12	(2)

Charts are omitted where the number of whales marked during the month does not exceed ten; in the table these occurrences are indicated by the numbers in brackets.

The marking seasons have been of very variable lengths. On the eastern grounds the 'William Scoresby' marked for three seasons (1934–5, 1935–6 and 1936–7), commencing early in December and ending in March. On the South Georgia grounds the hired whale catcher started operations towards the end of November or in December, and continued to mid-January or early February. The 'William Scoresby's' season on the western grounds (1937–8) lasted from November to the latter half of February. No single month is complete for every season and expedition.

DISTRIBUTION OF WHALES MARKED

I. BLUE WHALES

(*a*) *Western Area*

(1) November (Plate VA). A few Blue whales have been marked during this month east of South Georgia on the grounds frequented by the whalers. The 'William Scoresby' in 1937 marked a few odd whales to the eastward between latitudes 56 and 58° S.

(2) December (Plate VB). Fair numbers were marked during this month south and east of South Georgia, mostly in 1934 and 1935. No Blue whales were marked from South Georgia in 1936. The 'William Scoresby' marked a very few near the Greenwich meridian at the extreme point of an easterly cruise.

(3) January (Plate VI). Few Blue whales were marked—less than half the December total—and these, to the south-east, south and west of South Georgia, were virtually all marked in 1935.

In February only one Blue whale was marked, and that was to the west of Grahamland. Only one Blue whale was marked in the South Georgia area during the season 1936–7.

(*b*) *Eastern Area*

The 'William Scoresby' was never very successful in the pursuit of Blue whales, and on no occasion were large numbers marked, the most successful season being 1936–7.

(1) December (Plate VII). A few were marked in this month in ones and twos, their distribution showing the arrival of the vessel at the pack-ice edge south of South Africa at the beginning of the season and the progress eastwards from there.

(2) January (Plate VIII). The small number of 105 marked in this month falls into an eastern group, mostly marked in 1937, and a western group off Enderby Land, mostly marked in 1935. The season 1935–6 yielded few Blue whales in this month.

(3) February (Plate IX). A few more Blue whales were marked in this month than in January, and these again fall into two similar groups, the western group lying farther to the westward. These western whales were largely marked in 1937, and the eastern group entirely in 1936.

(4) March (Plate X). Operations in this month were always confined to the western part of the area, as the ship was then lying conveniently for the commencement of the return voyage. Only a few Blue whales were marked.

It is noticeable that two grounds with a blank area between them are clearly shown by the marked whales. Very few Blue whales have been marked between 50 and 80° E and only two between 60 and 70° E.

II. FIN WHALES

(*a*) *Western Area*

(1) November (Plate XIA). Few Fin whales have been marked during November around South Georgia. The whale catcher only worked in this month during two seasons and then for only a few days; and an attempt in 1937 by the 'William Scoresby' to mark whales north of South Georgia during this month was foiled by bad weather. Towards the end of the month a few were marked at the beginning of a cruise to the eastwards. In 1934 a few Fins were marked to the south-east of South Georgia, and in 1935 a few in the vicinity of the Shag Rocks.

(2) December (Plate XIB). Large numbers of Fin whales, distributed widespread around South Georgia, have been marked in this month. Many were marked within 70 miles of the Shag Rocks, most of them in 1936. Another area of heavy marking lies to the east of South Georgia where many were marked in 1932, 1934 and 1935. A moderate number has been marked between 30 and 90 miles south of the island. The 'William Scoresby' in 1937 continued cruising eastwards as far as the Greenwich meridian, returning during the latter part of the month, but only moderate numbers of whales were marked.

(3) January (Plate XII). This has always been a very successful month for marking Fin whales around South Georgia. Large numbers, about 450, have been marked within 70 miles of the Shag Rocks, most of them in 1937 but also many in 1933 and in 1935. In 1936 many Fins were marked to the south-east of South Georgia. During the first half of this month in 1938 the 'William Scoresby' marked fair numbers between the South Sandwich group and the South Orkneys, and in the second half of the month small numbers to the west of the South Shetlands and Grahamland on a course into the Bellingshausen Sea.

(4) February (Plate XIII). Around South Georgia marking in this month took place only for a few days in 1937, resulting in a small number of whales being marked between the southern part of that island and Zavodovski Island in the South Sandwich group. In 1938 the 'William Scoresby' marked a moderate number of Fin whales to the west of Adelaide Island in the eastern part of the Bellingshausen Sea and in the Bransfield Strait.

(5) March (Plate XIV). A small number were marked in this month between 5° E and 10° E in 1935 and 1937.

(*b*) *Eastern Area*

(1) December (Plate XV). Most of the Fin whales marked in this month—and they are only a moderate number (169)—lie between 20 and 30° E where the 'William Scoresby' usually commenced operations on arriving at the pack-ice edge, as explained above under 'Blue whales'.

(2) January (Plate XVI). Only 286 Fin whales were marked in the eastern area this month. Those between 57 and 97° E were mostly marked in 1937; greater numbers, between 42 and 55° E, off Enderby Land were mostly marked in 1935.

(3) February (Plate XVII). This is the best Fin whale month in this region, with 431 whales marked. These are spread out in a rather scattered manner from 35 to 105° E, but between 20 and 35° E quite significant numbers were marked in 1935 and 1937. The most easterly whales were marked in 1936. It is to be noted that very few Fin whales were marked in January and February between 60 and 90° E, and almost all these were in 1937. This region was traversed several times in February, and in good weather, by the 'William Scoresby', but very few whales of any kind were seen.

(4) March (Plate XVIII). As mentioned above March was spent in the western part of the area preparatory to turning homewards. Moderate numbers (302) have been marked between 08° E and 56° E with the major number between 19 and 48° E—a rather similar distribution to February. All whales east of 20° E were marked in 1936, and those to the west of this meridian in 1935 and 1937.

III. HUMPBACK WHALES

(*a*) *Western Area*

The Humpback whale is now a rare animal in waters around South Georgia and the number marked in the vicinity of the island is insignificant.

(1) December (Plate XIX). A very few whales were marked by the 'William Scoresby' in 1937 on the easterly cruise.

(2) February (Plate XIX). Early in the month in 1938 when the 'William Scoresby' was off Adelaide Island a small number of Humpbacks were met and some marked. These may be the depleted descendants of the large numbers of Humpbacks which early in the century frequented the channels of the South Shetland and Palmer Archipelago, and which probably make their winter migration to the west coast of South America.

(3) March (Plate XIX). A very few were marked in 1937 about 10° E.

(*b*) *Eastern Area*

(1) December (Plate XX). A few Humpbacks were marked in 1934, 1935 and 1936 between 24 and 34° E when the ship arrived on the grounds, and a few in 1934 about 95° E.

(2) January (Plate XXI). This was the best month for Humpbacks, 265 having been marked; these were nearly all between 85 and 98° E, and were mostly marked in 1937 with a smaller number in 1936.

(3) February (Plate XXII). Fewer were marked in this month (107)—almost all in 1936 on the easterly grounds between 87 and 99° E.

The Humpback whale keeps to much more definite areas and to more definite routes of migration than Fin and Blue whales, and the distribution of marked Humpbacks demonstrates distinct division into an eastern and a western group. These points have been well proved by the recovery of marks (Rayner, 1940). Humpback whales are more numerous on the eastern grounds around 95° E than in the western area of concentration (about 20–40° E), but they are, to all intents, absent between these two areas. No Humpback has been marked between 60 and 70° E and virtually none between 40 and 80° E. This separation of two groups largely holds good for Blue and Fin whales.

During the whale-marking cruises of the 'William Scoresby', three of them in the eastern and one in the western area, a widespread search has been made for whales and the vessel has not remained in areas of proved or reputed abundance. It can, therefore, be accepted that the regions of concentration or scarcity of marked whales, seen in Plates V to XXII, do in fact represent in a considerable degree the concentrations or scarcities of the actual population of whales during the time of these cruises. On

the other hand, the area covered is immense for one vessel, and the finding of any large concentration of Fin whales (in which thirty or forty whales might be marked in one day) is easily a matter of chance. The marked whales do not therefore necessarily give a complete picture of the distribution of the population. Weather is a factor of the greatest importance in this form of hunting (as demonstrated by the experience of the whaling fleet in 1945–6), for bad weather, either in the form of poor visibility or gales, easily obscures a present abundance of whales. In these regions, however, January and February usually give good conditions with calm seas, good visibility and the long daylight so favourable to pursuit.

PLATE VA

Chart showing distribution of marked Blue whales, Western Area, for November.

PLATE VB

Chart showing distribution of marked Blue whales, Western Area, for December.

NOVEMBER
DECEMBER
50°
10°
20°
30°
40°
50°
60°
0°
30°

PLATE VI

Chart showing distribution of marked Blue whales, Western Area, for January.

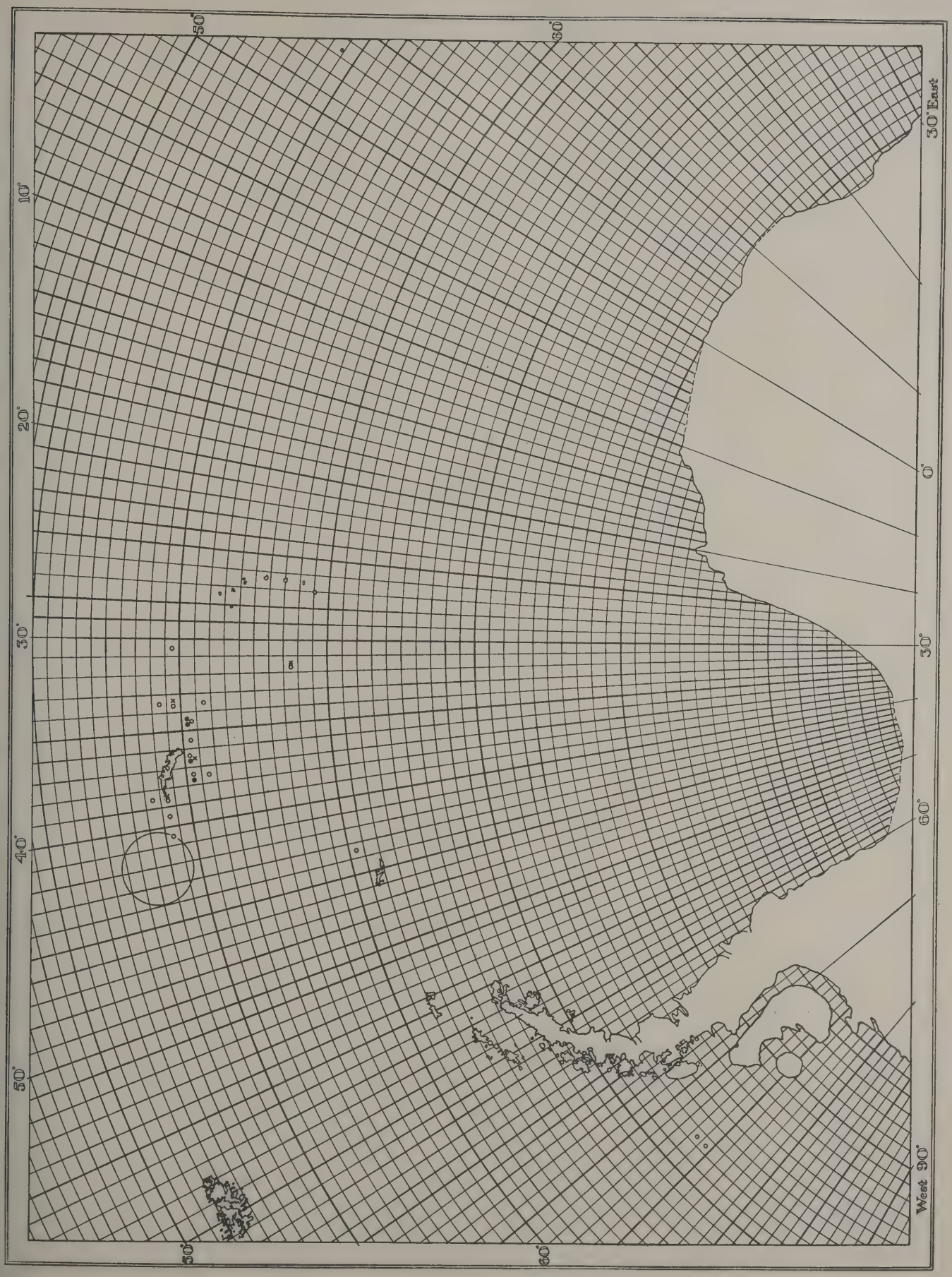

50°
60°
30° East
10°
20°
0°
30°
40°
60°
50°
West 90°
50°
60°

PLATE VII

Chart showing distribution of marked Blue whales, Eastern Area, for December.

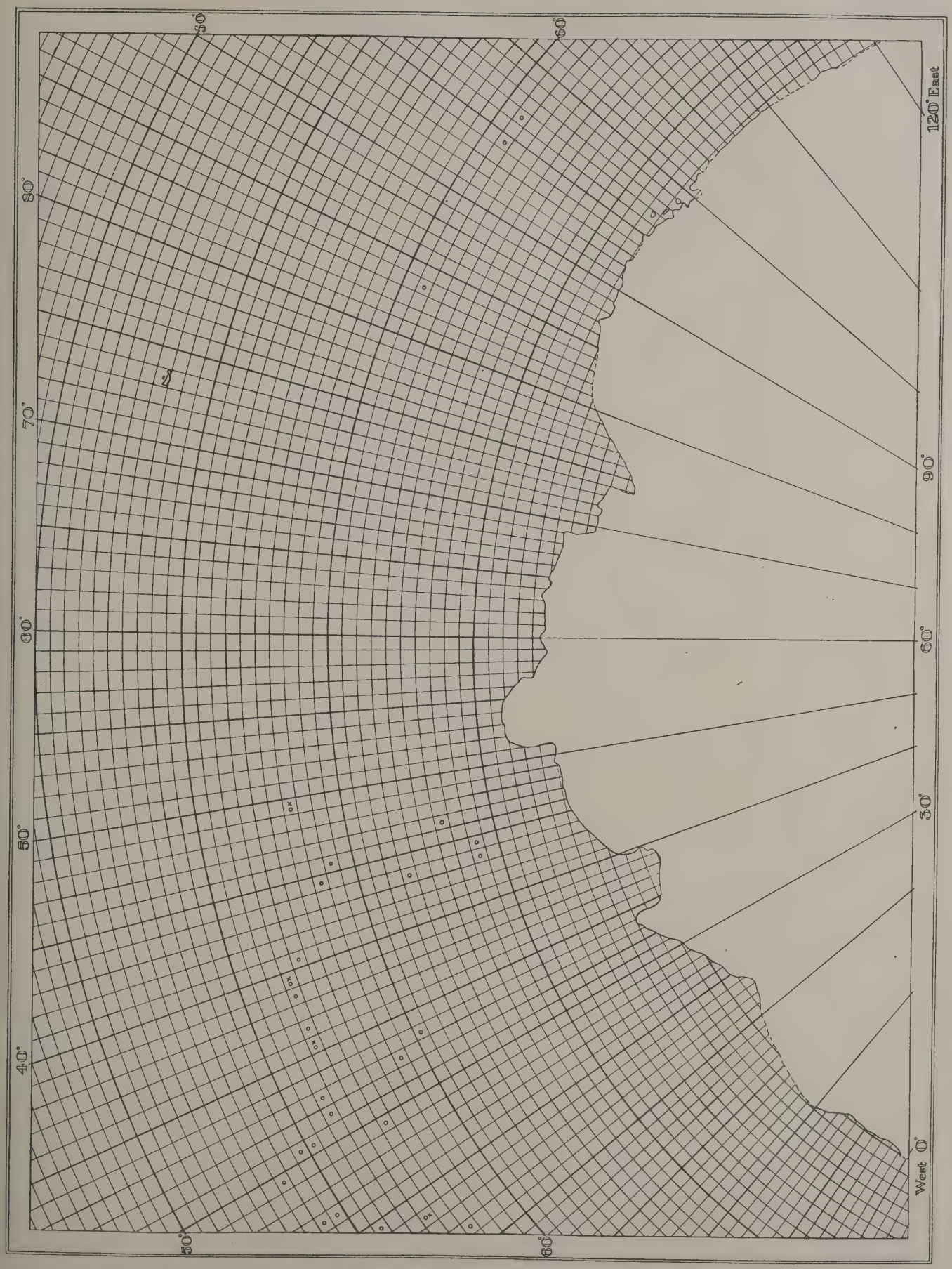

50°
60°
120° East
80°
70°
90°
60°
60°
30°
50°
40°
West 0°
50°
60°

PLATE VIII

Chart showing distribution of marked Blue whales, Eastern Area, for January.

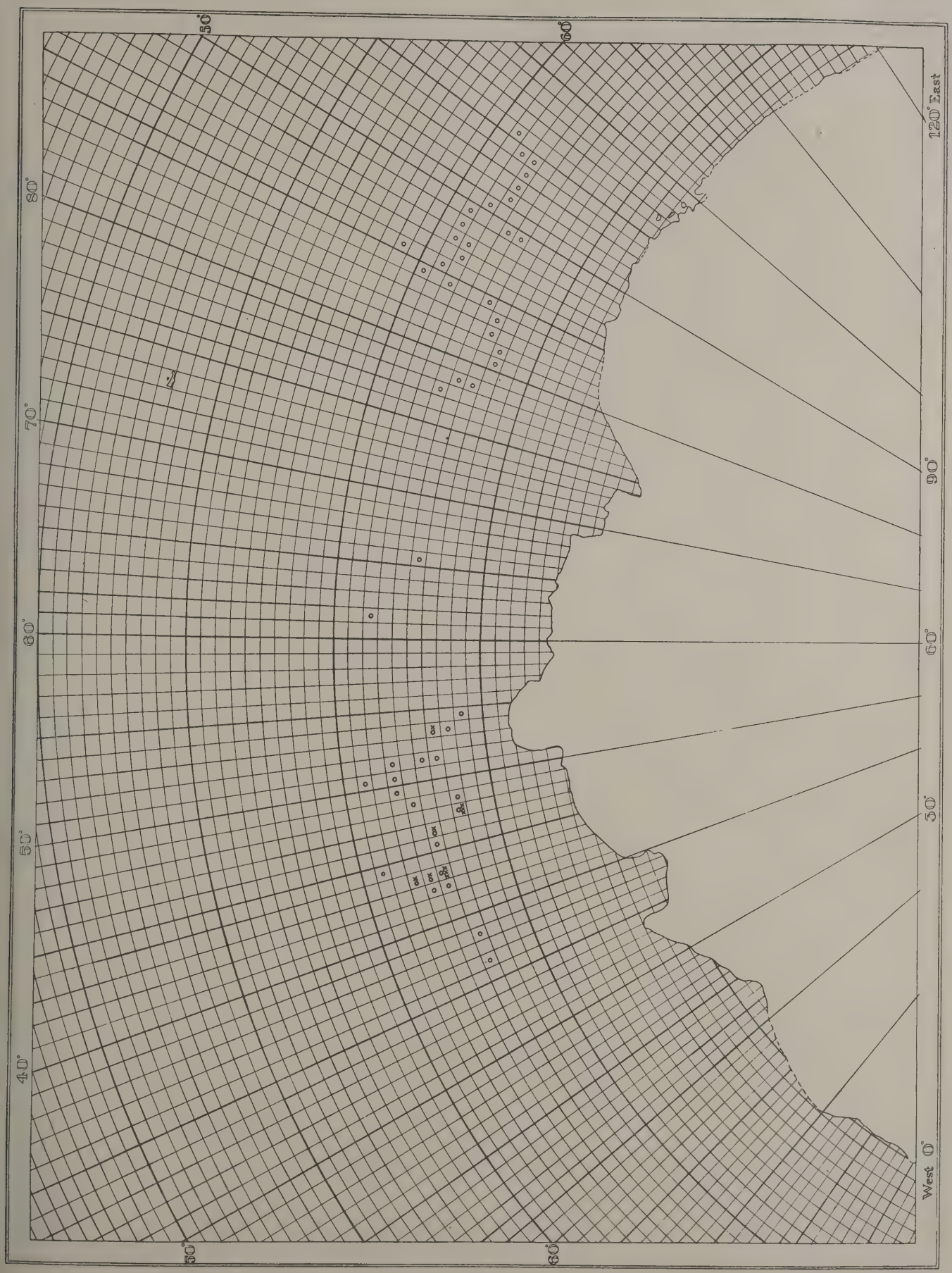

50°
60°
120° East
80°
70°
90°
60°
60°
50°
30°
40°
West 0°
50°
60°

PLATE IX

Chart showing distribution of marked Blue whales, Eastern Area, for February.

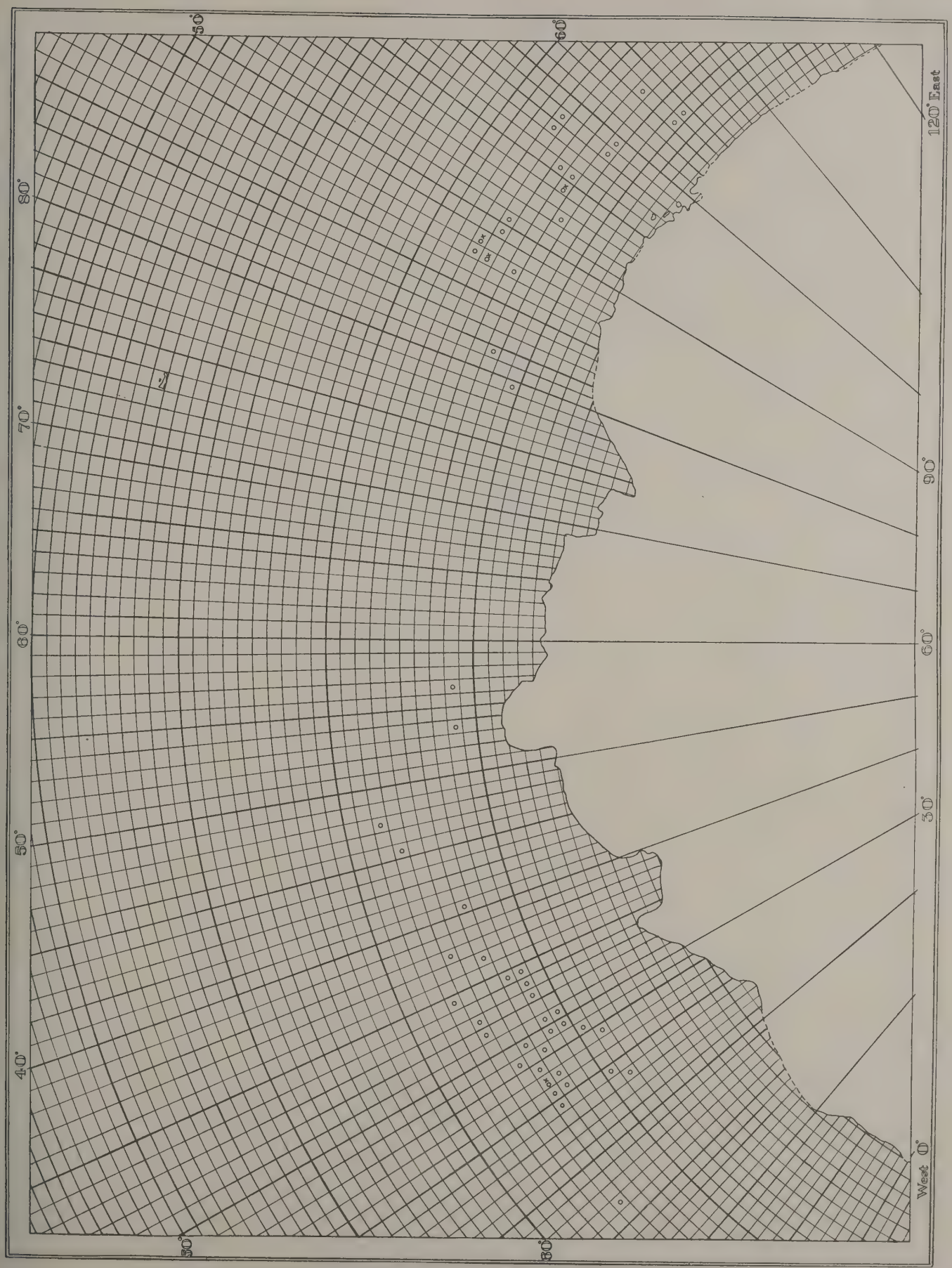

50°
60°
120° East
80°
70°
90°
60°
60°
50°
30°
40°
West 0°
50°
30°

PLATE X

Chart showing distribution of marked Blue whales, Eastern Area, for March.

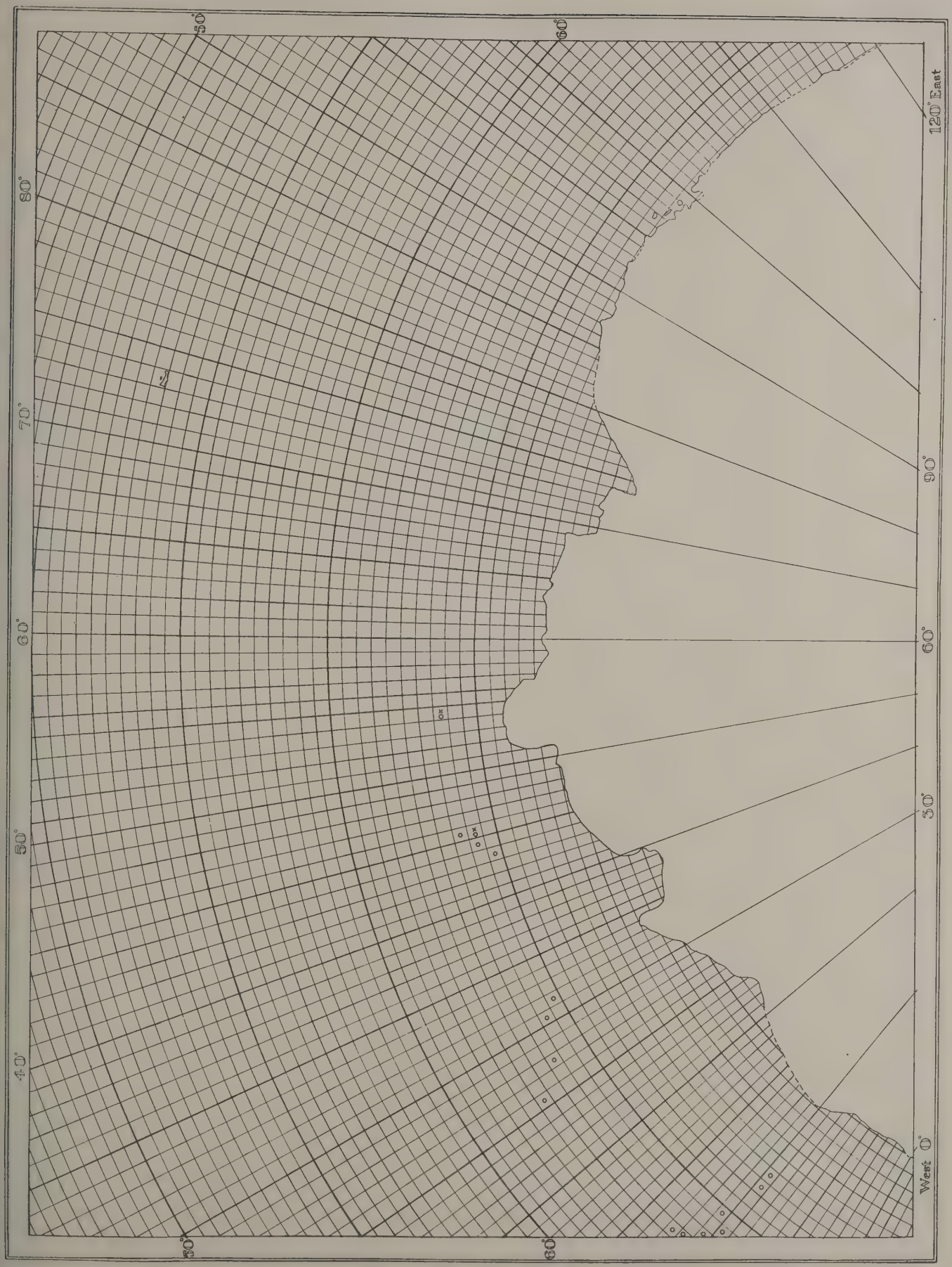

50°
60°
120° East
80°
70°
90°
60°
60°
50°
50°
40°
West 0°
50°
60°

PLATE XIA

Chart showing distribution of marked Fin whales, Western Area, for November.

PLATE XIB

Chart showing distribution of marked Fin whales, Western Area, for December.

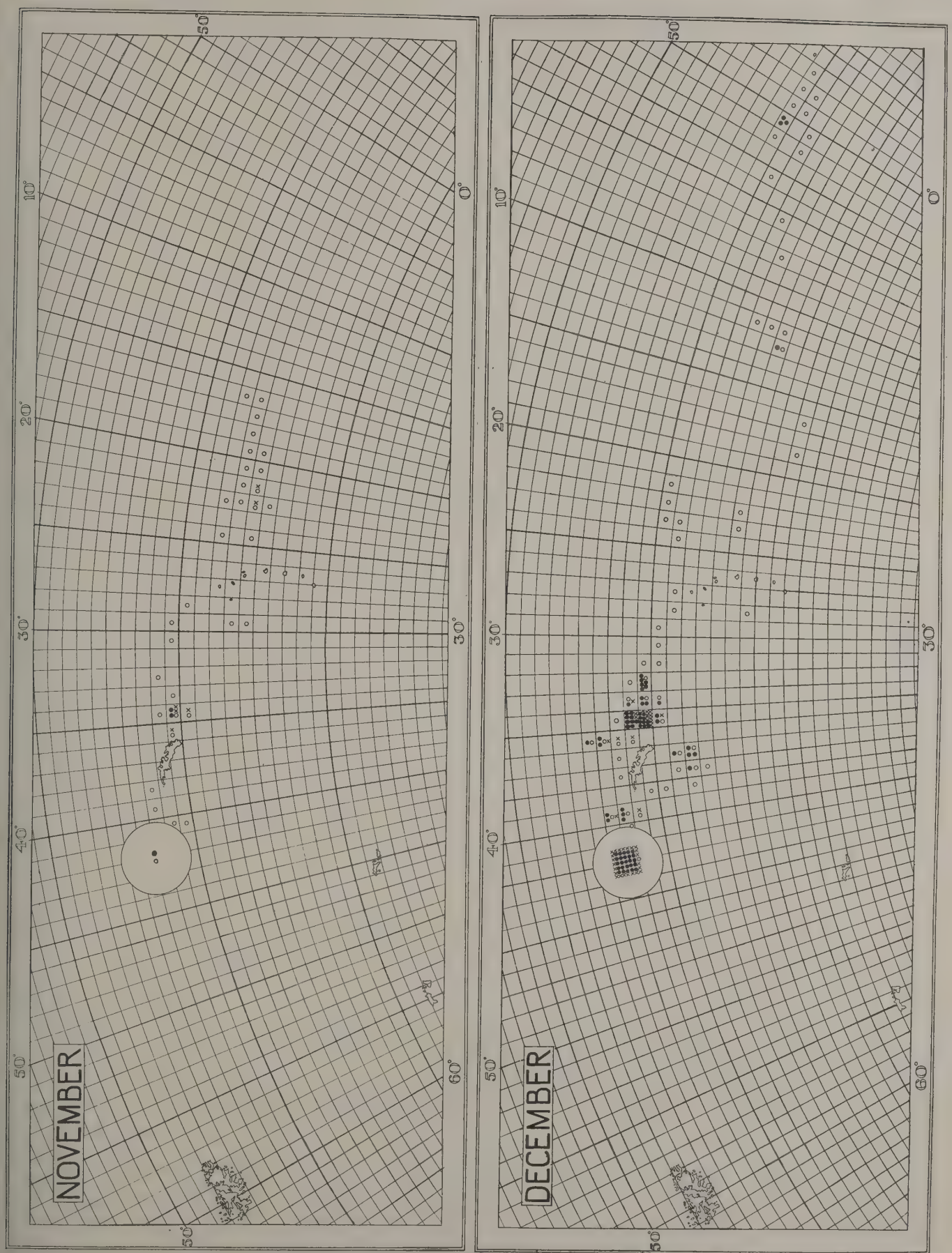

NOVEMBER
DECEMBER
50°
10°
0°
20°
30°
40°
50°
60°

PLATE XII

Chart showing distribution of marked Fin whales, Western Area, for January.

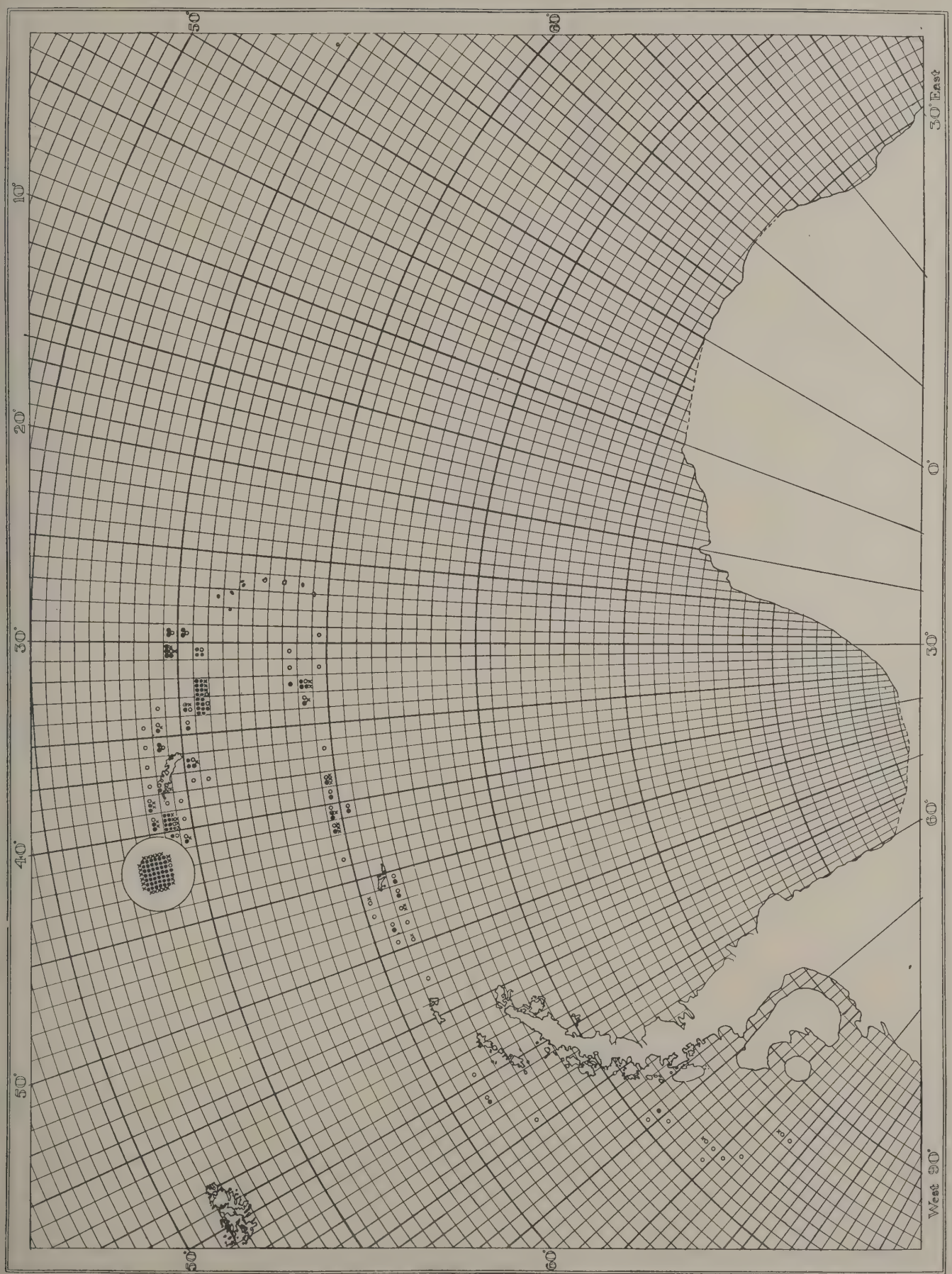

50°
60°
30° East
10°
20°
0°
30°
30°
40°
60°
50°
West 90°
50°
60°

PLATE XIII

Chart showing distribution of marked Fin whales, Western Area, for February.

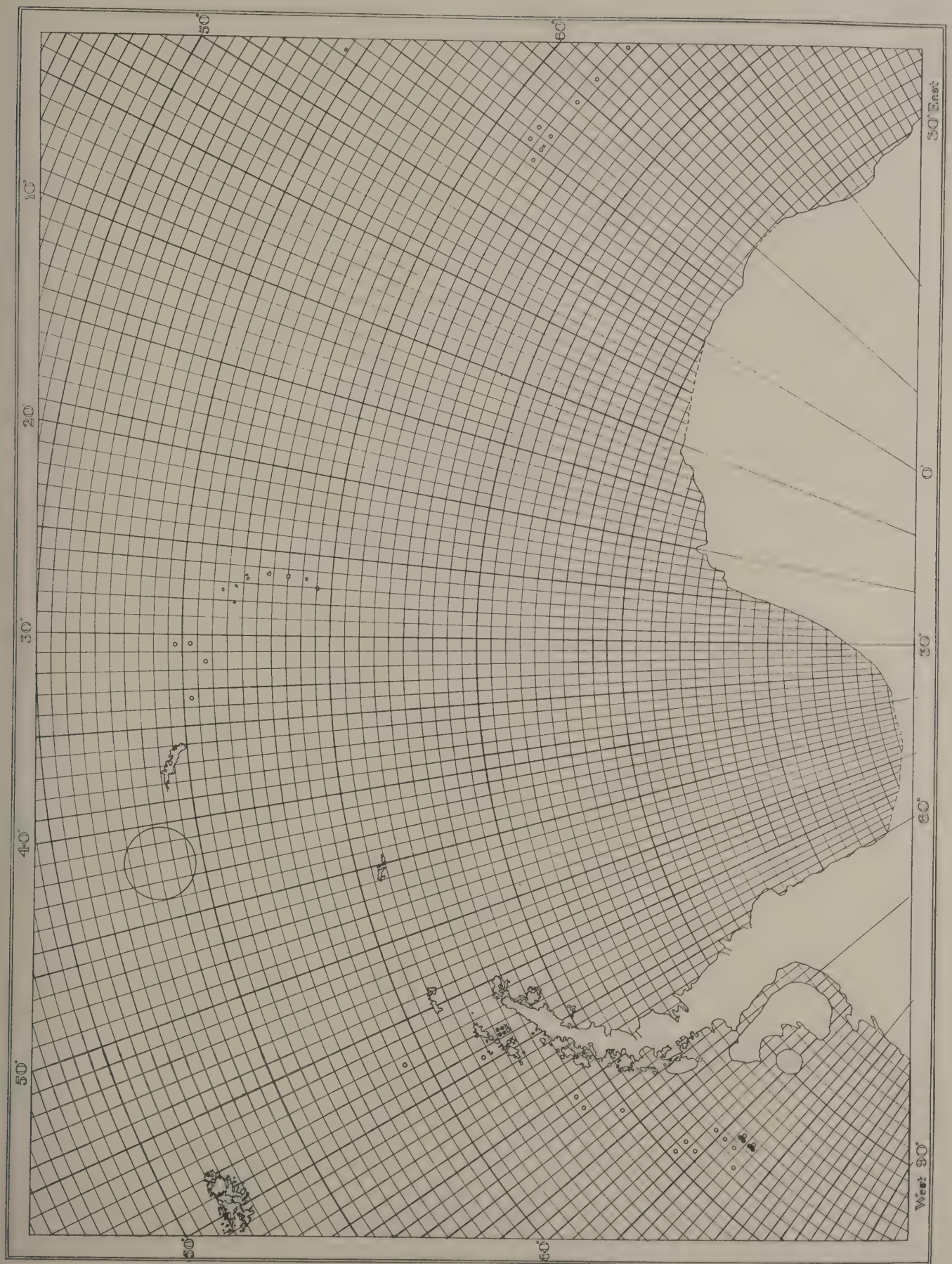

50°
60°
30° East
10'
20'
0°
30'
30°
40'
60°
50'
West 30°
50°
60°

PLATE XIV

Chart showing distribution of marked Fin whales, Western Area, for March.

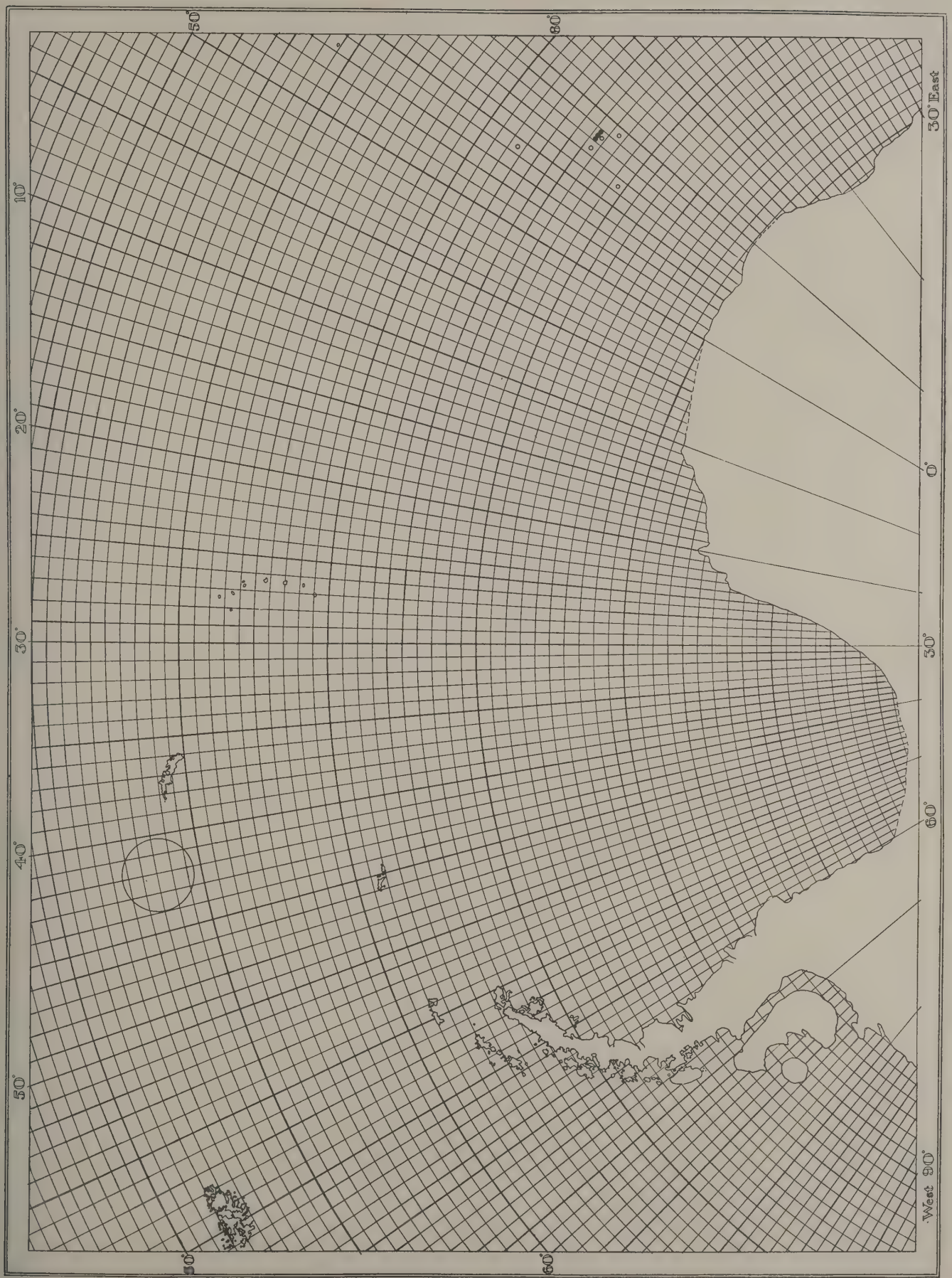

50°
80°
30° East
10°
20°
0°
30°
50°
40°
60°
50°
West 90°
30°
60°

PLATE XV

Chart showing distribution of marked Fin whales, Eastern Area, for December.

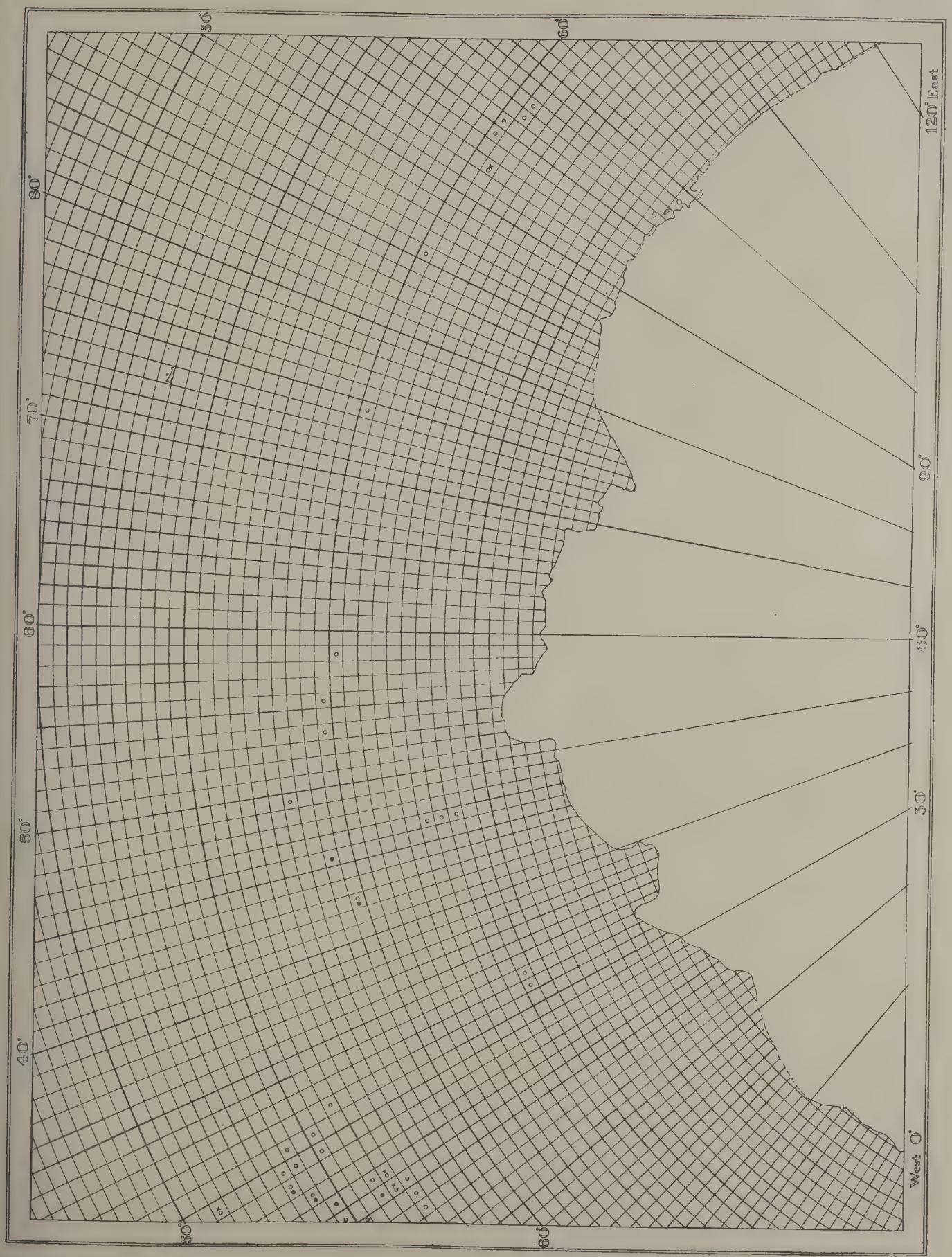

50°
60°
120° East
80°
70°
90°
60°
60°
50°
30°
40°
West 0°
50°
60°

PLATE XVI

Chart showing distribution of marked Fin whales, Eastern Area, for January.

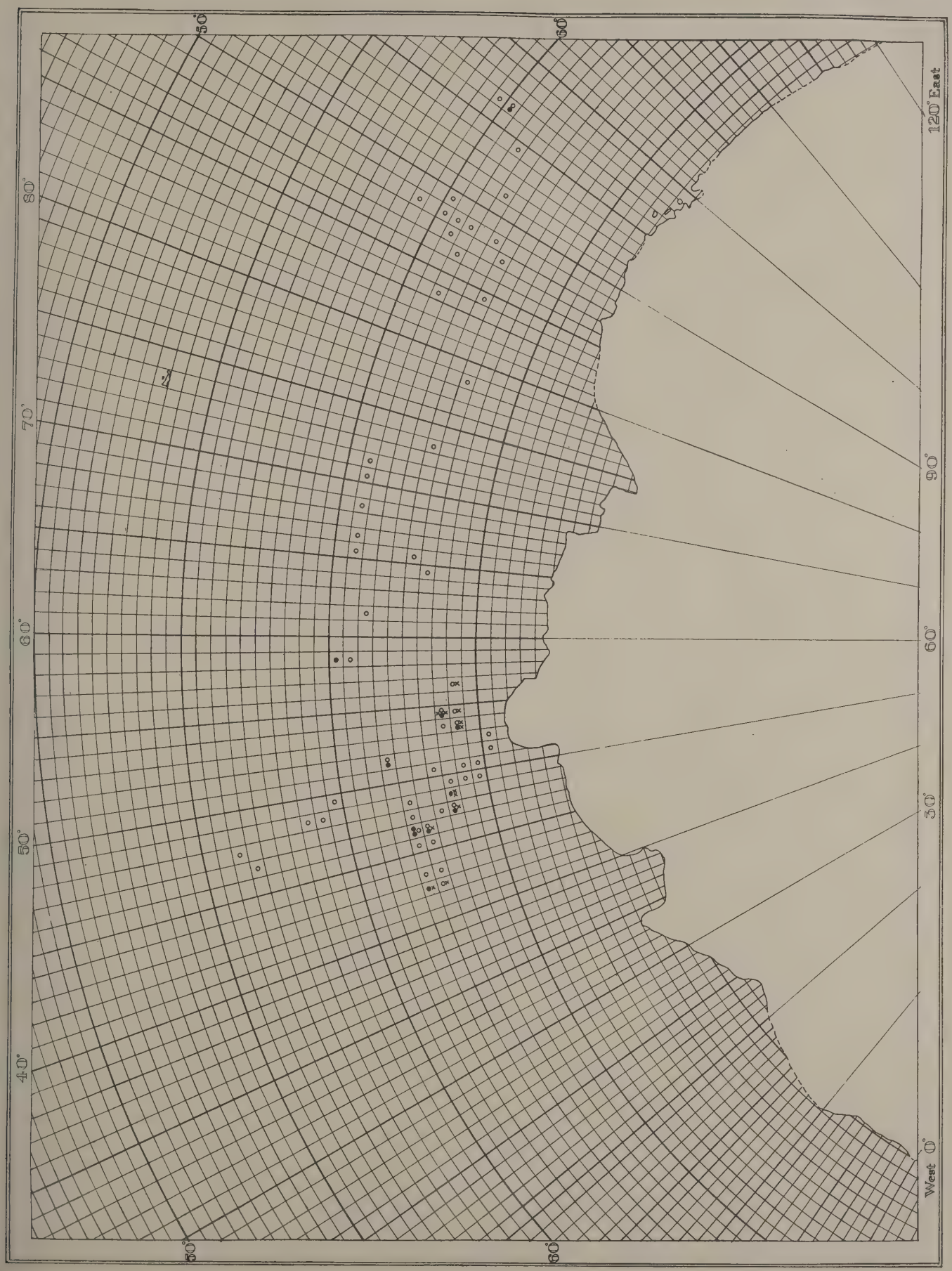

50°
60°
120° East
80°
70°
90°
60°
60°
50°
30°
40°
West 0°
50°
60°

PLATE XVII

Chart showing distribution of marked Fin whales, Eastern Area, for February.

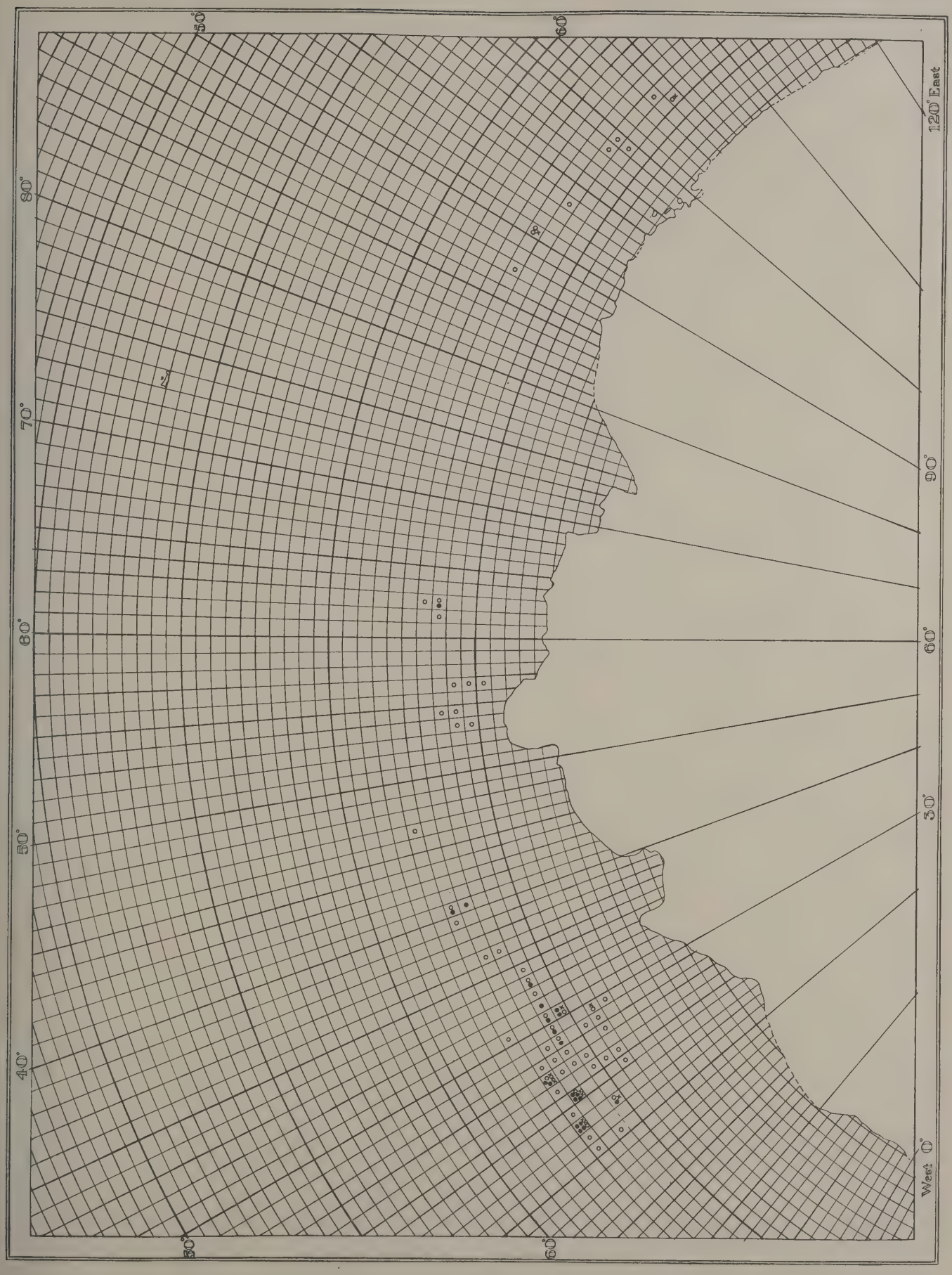

50°
60°
120° East
80°
70°
90°
60°
50°
30°
40°
West 0°
50°
60°

PLATE XVIII

Chart showing distribution of marked Fin whales, Eastern Area, for March.

60°
50°
West 0°
40°
50°
30°
60°
60°
90°
70°
80°
120° East
60°
50°

PLATE XIX

Chart showing distribution of marked Humpback whales, Western Area, for December, February and March.

50°
60°
FEB
MARCH
30° East
10°
20°
0°
DEC
30°
30°
40°
60°
50°
JAN
West 90°
50°
60°

PLATE XX

Chart showing distribution of marked Humpback whales, Eastern Area, for December.

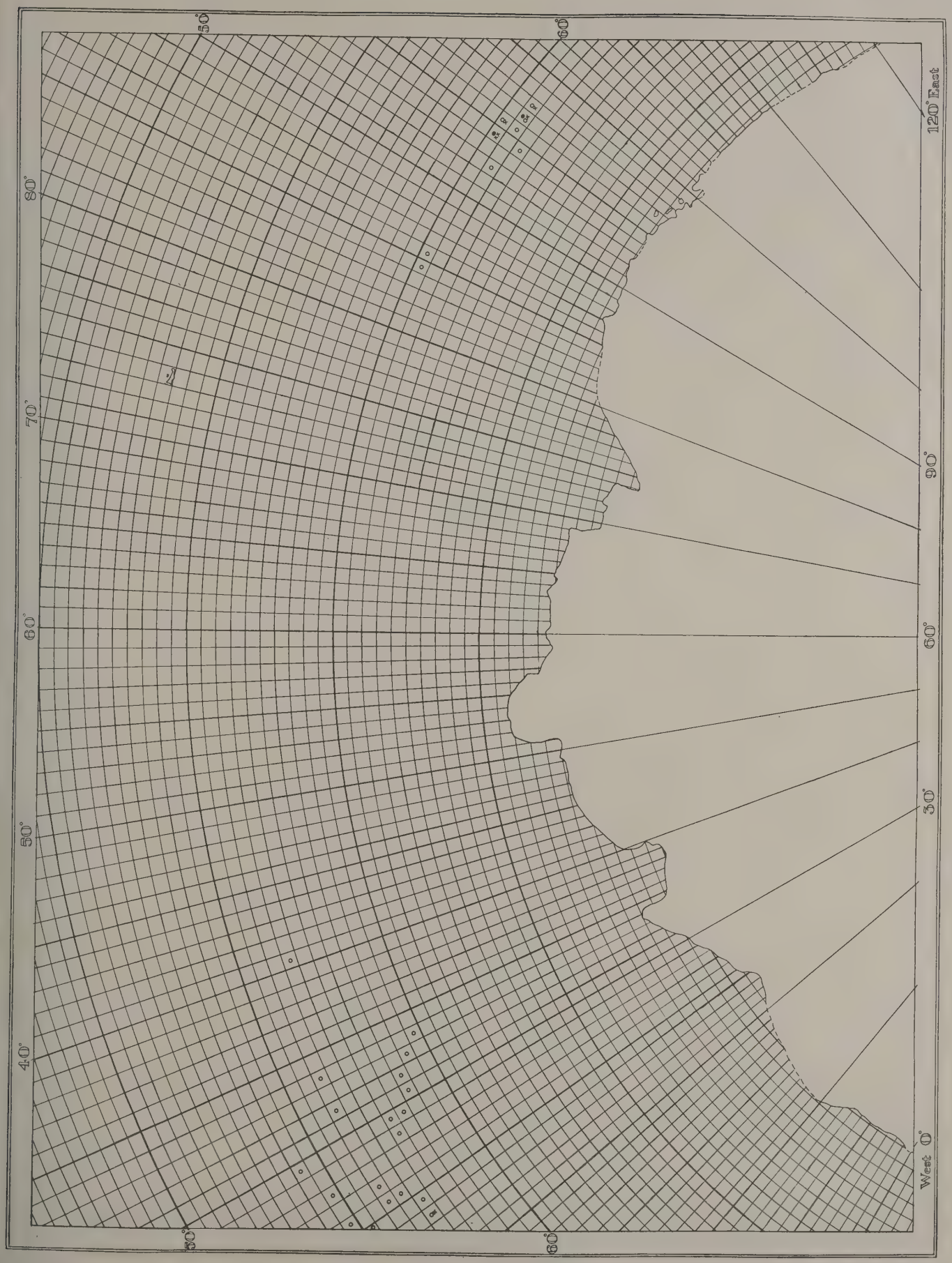

50°
60°
120° East
80°
70°
90°
60°
60°
50°
30°
40°
West 0°
50°
60°

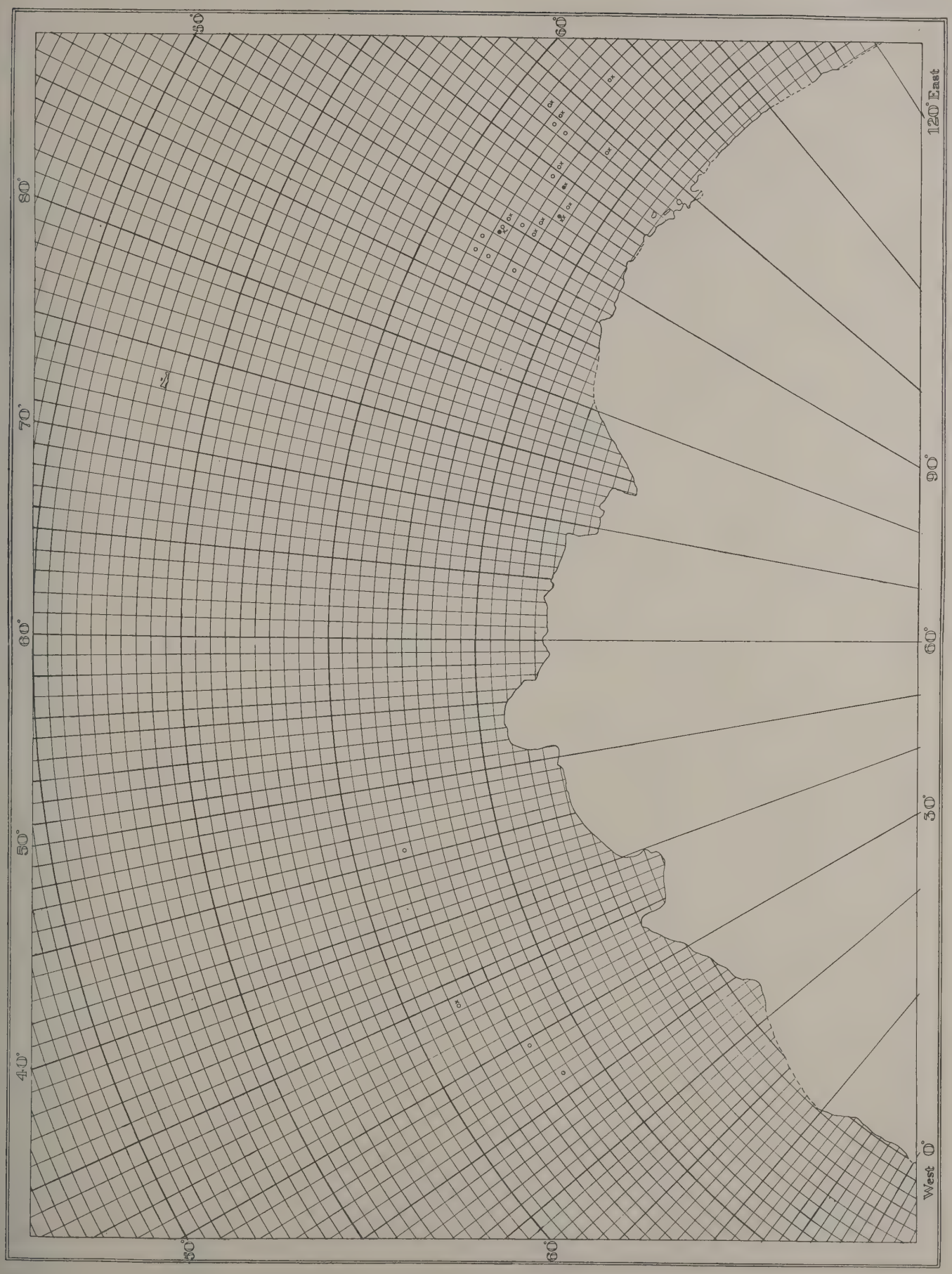
PLATE XXI

Chart showing distribution of marked Humpback whales, Eastern Area, for January.

50°
60°
120° East
80°
70°
90°
60°
30°
50°
40°
West 0°
50°
60°

PLATE XXII

Chart showing distribution of marked Humpback whales, Eastern Area for February.


50°
60°
120° East
80°
70°
90°
30°
50°
60°
40°
30°
West 0°
50°
60°